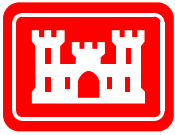


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Risk Assessment and Management for Ordnance and Explosives Response Projects

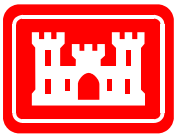


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What is Risk?

- Likelihood or Possibility of Harm (Webster's)
- Individual Perception of Possibility of Harm
- Expected Number of UXO Exposures (Statistical Model's)
- Hazard Probability by Hazard Severity (RAC Sheet's)



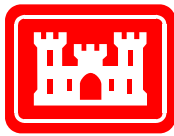
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Research on Risk– Key Findings



- Seriousness
 - The level of risk has very little effect on the Public's perception of risk
- Technical Detail
 - Increasing the amount of technical detail has no effect on perceived risk
- Outrage
 - When agency behavior seems unresponsive and agency-community relationship seems poor, the Public tends to judge the risk as more serious

–Outrage and Technical Detail: The Impact of Agency Behavior on Community Risk Perception, New Jersey Department of Environmental Protection and Energy, January, 1991

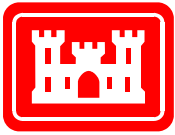


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Key Findings (continued)



- Bottom Line: Outrage has a substantial impact on Public perception of risk – more than the level of the risk and far more impact than any technical explanation of the risk

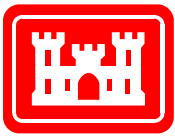


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Key of Success

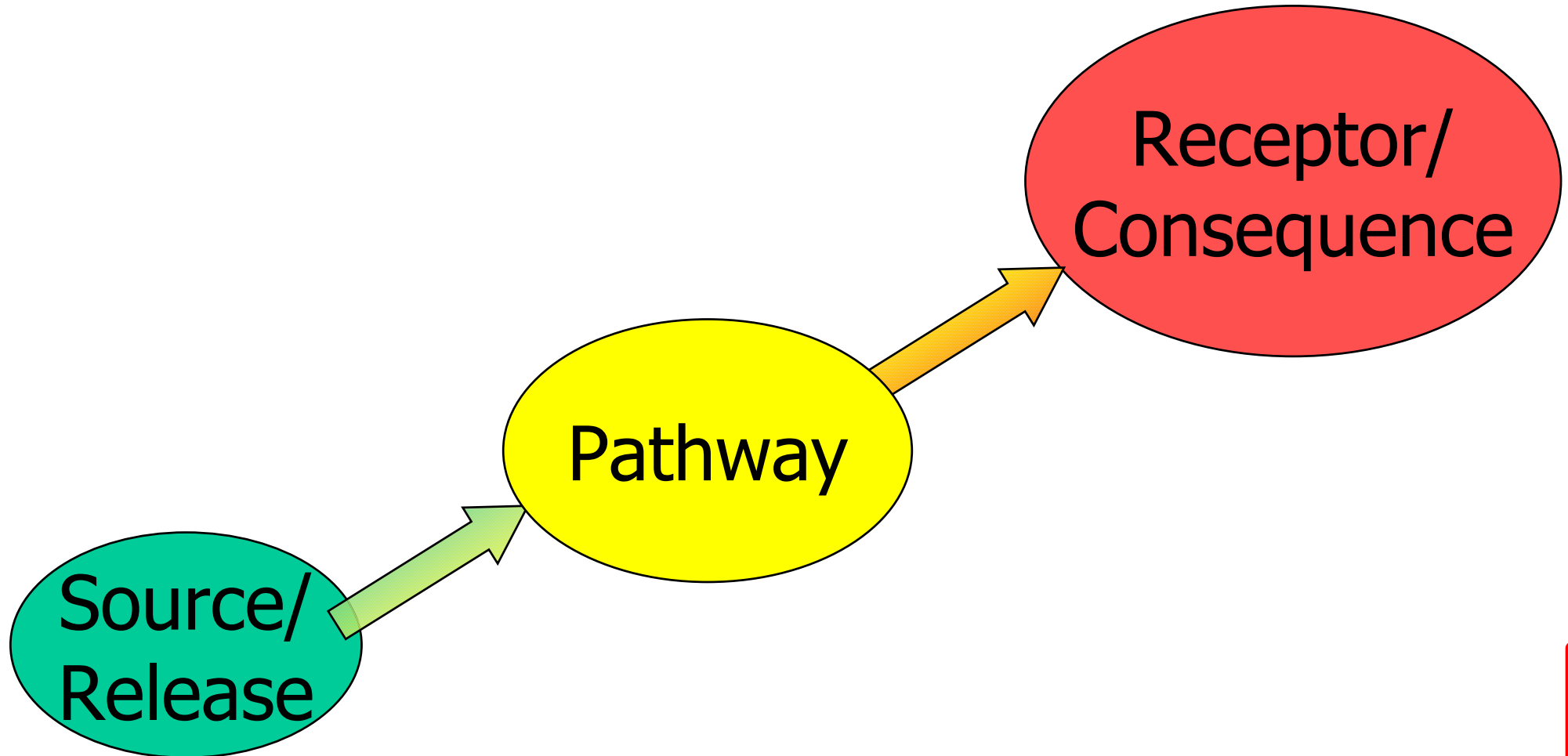
- The key to assessing risk effectively is effective communication. If you cannot communicate what you know about risk on a project you are not going to be successful.

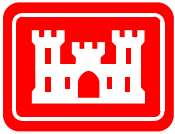


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Environmental Risk

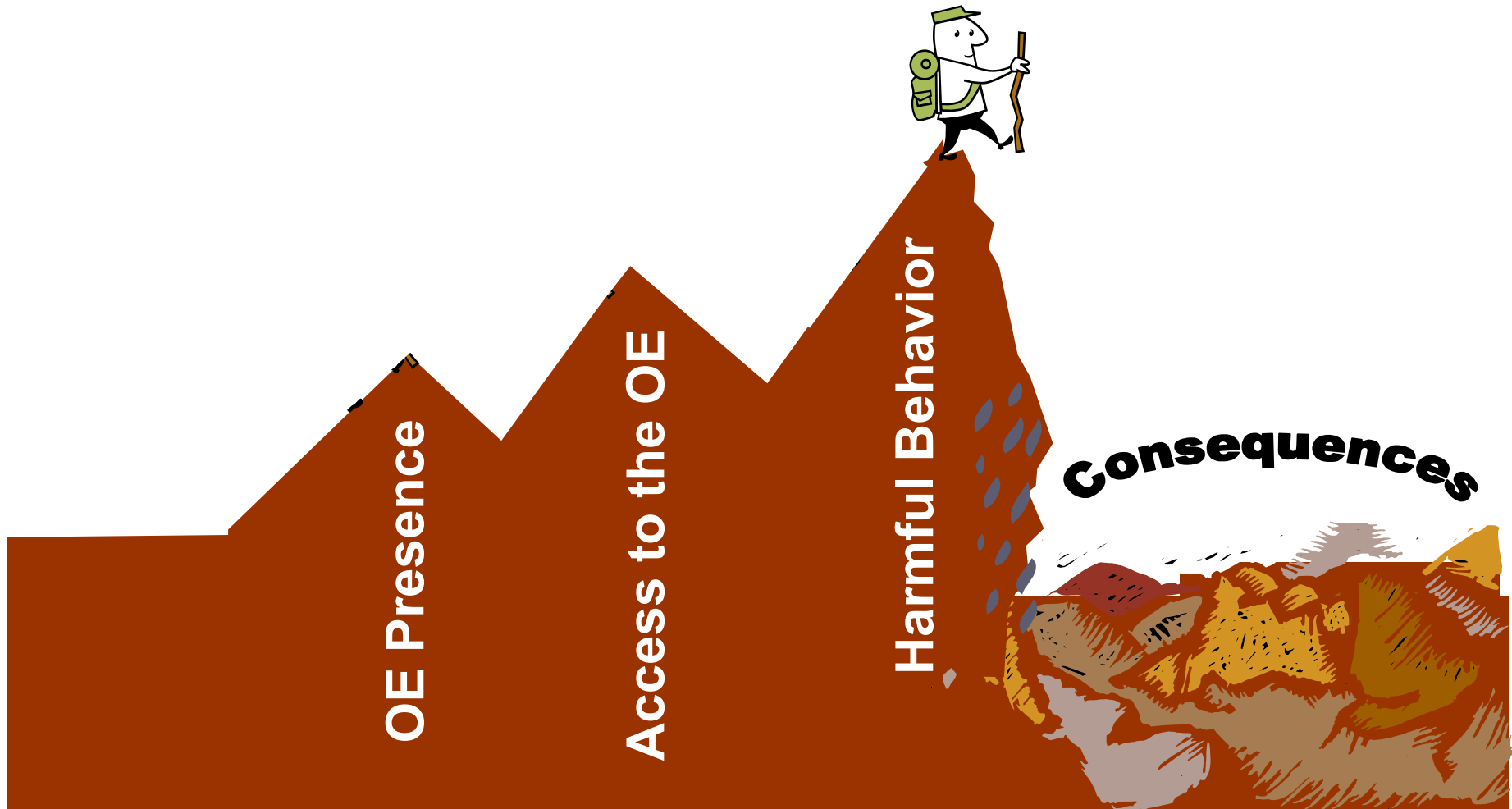


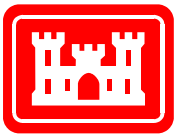


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OE Risk Step Function



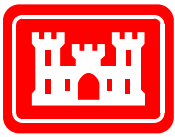


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OE Risk Assessment History



- 1990 - Developed RAC to prioritize projects by risk
- 1993 – Developed OECert to assess risk from exposure to OE
- 1994 – Developed SiteStats to characterize areas of concern
- 1995 – Developed GridStats to help characterize grids with a large number of anomalies
- 1997 – Developed UXO Calculator to assist in characterizing sites using geophysical methods
- 1995 - 2001 – DoD developed IR3M to assess risk and evaluate response alternatives
- 2001 – Developed OERIA to assess risk



Response Alternatives

- Response alternatives are composed of 2 risk reduction parts:
 - Physical.
 - Remove the hazard, not 100% effective.
 - Institutional Controls.
 - Manage the remaining hazard.
- Effectiveness of the implemented response alternatives is assessed and maintained via use of recurring reviews after the completion of the removal action.

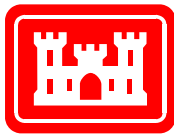


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Old OE Risk Assessment Paradigm



- Statistically assess the area to determine the expected OE density.
- Based upon input including OE density, OE depth, sweep efficiency, site vegetation, site terrain, site activities, and site population, run OECert to predict the number of exposures:
 - Associated with a particular activity.
 - For the site as a whole for a year.
- Communicate risk in the form of exposures.

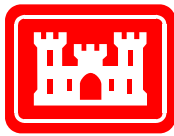


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Present OE Risk Assessment Paradigm



- Risk is assessed and presented for communication purposes rather than to quantify it.
- Risk is assessed qualitatively.
- Inputs into the risk assessment are decision dependent and are at the discretion of the Project Team.

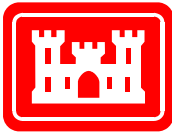


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OE Risk Impact Assessment (OERIA)

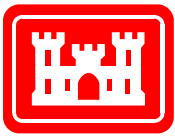


- Qualitative risk assessment for OE sites
- Can be used as an input to the Protectiveness of Public Health and the Environment factor of the Effectiveness criterion of a response alternatives evaluation

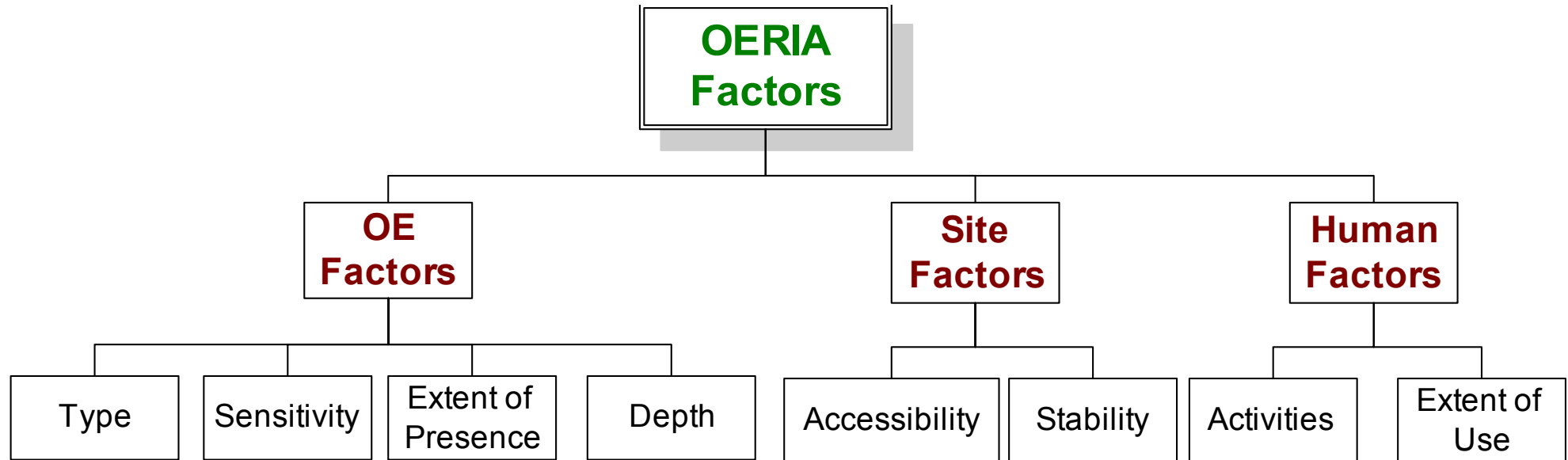


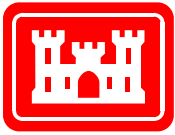
OERIA Process

- Step 1: Risk Factors Selection.
 - Establish the important factors involved in risk from OE.
- Step 2: Baseline Risk Assessment.
 - Communicate what we know about those factors as pertains to the site.
- Step 3: Assess Response Action Alternatives.
 - Explain how the response action alternatives will impact the risk factors baseline conditions.



OERIA Factors



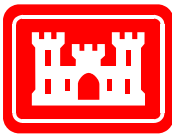


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Data Requirements

- The data requirements for input into OERIA are based upon what the team needs to communicate the risk and effectively evaluate the response alternatives.

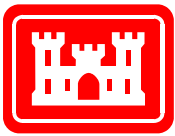


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Ranking of Alternatives

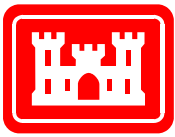


Alternative	Ordnance				Site		Human		Overall Rank
	Type	Sensitivity	Presence	Depth	Access	Stability	Activity	Extent of Use	
Baseline Risk Assessment (Existing Cond)	Cat 1 22mm HE	Cat 2	0.18 OE per acre	0-6"	No restriction to site	Site stable	Significant (hiking, other recreational)	~200 people per day	
No DoD Action Indicated	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	D
Institutional Controls	No Impact	No Impact	No Impact	No Impact	A	No Impact	A	A	B
Surface Clear w/Institutional Controls	No Impact	No Impact	B	B	A	No Impact	C	B	B
Clearance to Detectable Depth, w/ Institutional Controls	A	A	A	A	No Impact	No Impact	B	C	A



What happens next?

- Use results of OERIA to “help” rate the effectiveness criterion for each response alternative under consideration.
- Select the response alternative based upon an evaluation of effectiveness, implementability, and cost.
- Assess and maintain the effectiveness of the implemented alternative.



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Final Thoughts on Risk



- Keep risk assessment simple and easy to communicate.
- Emphasize effective communication when dealing with risk.
- Emphasize a two part response of physical removals to remove what hazards we can and institutional controls to manage the risk from residual hazards.